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the various forms are so different in appearance, under the microscope the leaves are identical. The coarse doubly dentate margins, the strong midrib, and the punctate cells in the lower leaf angles are the same in all.

*Claopodium crispifolium* is common on rocks and trees. It is indistinguishable from *C. Bolanderi* except under the microscope. *C. Bolanderi* is found on rocks, while *C. Whippleanum* is found on rocks and soil and resembles *Plagiothecium elegans*.

*Dendroalsia abietina* is rare. Besides *E. stoloniferum* three Eurhynchiums are common, *Oreganum*, *praelongum* with its variety *Stokesii*, and *fallax*. *E. fallax* was to be found only at high altitudes. Growing at lower altitudes and hidden away about the roots of cedars is to be found a large Eurhynchium with variegated copper colored pinnae. One never obtained very much of it as it was hard to find. It belonged to the blunt leaved division of Eurhynchia. Its capsule was a beautiful chestnut red.

*Plagiothecium undulatum* is plentiful in proper locations. On humus or rotten logs, and *P. denticulatum* is common.

The Heterocladiums, *H. heteropteroides* and *H. procurrens*, are high-land mosses and are found on rocks. On vertical rocks, where there is plenty of water, *H. heteropteroides* assumes the variety *filescens*. On flat rocks it grows with short pinnae and fruits freely. *H. procurrens* is easily recognized by its complanate leaves and feathery pinnae and at altitudes of one thousand feet it becomes the commonest of the rock mosses.

Amblystegiums are rare in my locality though several are accredited to the island.

Seattle, Wash.

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## NOTES ON THE MOSSES OF WATERVILLE, NEW HAMPSHIRE.

ANNIE LORENZ.

The settlement of Waterville, N. H., lies in the Mad River Valley, at 1550 ft. altitude, north of Sandwich Dome, with Mt. Osceola (4352 ft.) forming the northern end of the valley. Very little collecting appears to have been done there. The only specimens seen by the writer are a few in the hotel herbarium, collected by Mrs. Helen E. Jelliffe in August, 1896.

Waterville is a granite-and-drift region, the absence of limestone making peculiar gaps in the flora, phanerogamous as well as cryptogamous. The most unusual place in the region is the ravine known as the "V" on the southern slope of Mt. Tripyramid. It consists of two steep granite slopes, meeting at an angle of 90 degrees, and running west by north. The southern side has a rich cover of *Sphagna*, various *Hypna* and *Hylacomia*, *Philonotis*, *Scapania*, and such, all heavily fruited. The best thing there is *Blindia acuta* (Huds.) B. & S. in good fruit.

The summit of Mt. Osceola is a crumbly trachytic granite, cushioned with *Polytrichum strictum* Banks, with *Dicranum fuscescens* Turn. and *D. longifolium* Ehrh. on the scrub balsam, although *Lophozia gracilis* (Schleich.) Steph. is really the principal product. *Sphagna* are abundant, but only casually examined by the writer. *Andreaea petrophila* Ehrh. is com-

mon, not only on the summits, but on the rocks along the brooks, and usually heavily fruited, particularly on the north sides of the rocks.

One of the most interesting features of the bryophytic flora is the occurrence of *Dicranodontium longirostre* B. & S. exemplifying, as it does, the writer's theory as to its habitat,—namely, that it grows near water not above 45 degrees temperature. Of three stations, the largest is at Tyler's Spring (45 deg.) where it grows very abundantly on the banks near by, which are full of rotten wood. The second station is in a similar place by a spring (40 deg.) between the two Greeley Ponds: the third station is on a rock, near a cold stream feeding the upper Greeley Pond. *Dicranodontium* is instantly known by its intense green color, and its moulting when touched. “*Folia—quam maxime fragilia.*” (Bry. Eur.) The writer has so far always found it sterile in New England: it prefers banks full of old wood, but is sometimes found upon rocks.

On account of the exclusively siliceous formations, the Tortulaceae, *Saelania*, *Fissidens*, etc. are lacking. *Bryum* is mostly absent, the lack of *B. proliferum* (L.) Sibth., being rather noticeable, but *Pohlia nutans* (Schreb.) Lindb., and *P. elongata* Hedw. are frequent.

*Mnia* are abundant, but of few species. *Trematodon ambiguus* (Hedw.) Hornsch. is frequent, in dry fields, or by sandy roadsides. The Polytrichaceae are well represented, with five species of *Polytrichum*, three of *Pogonatum*, and one *Catharinea*.

The sphagnum bogs are almost pure stands, without the *Camptothecium*, the various *Hypna*, *scorpioides* L., *stellatum* Schreb., *revolvens* Swz. *Thuidium Blandowii* (W. & M.) B. & S. etc. of calcareous bogs. *Homalia Jamesii* Sch. is quite common on the north and northwest sides of granite boulders, also *Plagiothecium Muellermanum* Sch. in similar but more elevated situations.

Of the Marchantiaceae, only *Marchantia* and *Conocephalum* appear. *Diplophylla taxifolia* (Wahl.) Trevis. is rather common along the bases of rocks in stations above the level of the valley itself. *Lophozia gracilis* (Schleich.) Steph. is ubiquitous, and *L. incisa* (Schr.) Dum. is somewhat frequent on old stumps, *L. barbata* (Schreb.) Dum. is apparently absent.

The numerous trout streams have an abundant, but not particularly varied flora, *Scapania*, *Fontinalis*, *Rhacomitrium aciculare* Brid., *Hypnum eugyrium* B. & S., *H. dilatatum* Wils. with *Marsupellae* in the upper reaches.

In general, the list makes a good showing for a non-calcareous region, although it cannot compare with one in which both calcareous and siliceous formations are found.

These are merely notes of a several-week's stay, to be regarded as preliminary only, and not as exhausting the possibilities of a region which will well repay further exploration.

Hartford, Conn.